

Applicant: Yao Wang, et al.  
U.S.S.N.: 10/608,757  
Filing Date: June 27, 2003  
EMC Docket No.: EMC-01-141CIP2

**In the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the Application.

**Listing of Claims:**

1. (Currently amended) A software agent failure tolerant computer architecture for managing resources for transfer of data stored in a data storage environment including at least two data storage systems, the architecture comprising:  
a data transfer server;  
a primary software agent, designated as a primary software agent, in communication with at least one of the two data storage systems and the data transfer server, the agent configured for performing data transfer operations in response to commands from the data transfer server; one or more failover software agents in communication with the primary software agent, the data transfer server, and at least one of the two data storage systems;  
a failover protocol for determining an order in which said software agents are designated to take over the data transfer operation in response to one or more data transfer commands when a failure of one or more of said software agents is determined, wherein if the primary agent experiences a failure, ~~at least one of the one or more failover software agents takes over the data transfer operations in response to one or more data transfer server commands to take over.~~  
2. (Original) The architecture of Claim 1, wherein the data transfer operation is a replication of data within the data storage environment.

Applicant: Yao Wang, et al.  
U.S.S.N.: 10/608,757  
Filing Date: June 27, 2003  
EMC Docket No.: EMC-01-141CIP2

3. (Currently amended) The architecture of Claim [[2]] 1, wherein server commands to the software agents agent are sent over a network in accordance with an IP protocol.

4. (Currently amended) The architecture of Claim [[3]] 1, wherein the software agents agent communicate communicates with the at least one data storage system over the network in accordance with a Fibre Channel protocol.

5. (Currently amended) The architecture of Claim 1, wherein a predetermined hierachal relationship is followed by the data transfer server to select the order in which each the failover software agents server is are commanded to take over the work of the one or more determined failed the primary software agents server.

6. (Currently amended) A software agent failure tolerant computer architecture for managing resources for replication of data stored in a data storage environment including at least two data storage systems, and wherein data is replicated from one of the at least two data storage systems to at least one other data storage system of the at least two data storage systems, the architecture comprising:

a data replication management server;

a primary software agent, designated as primary software agent, in communication with at least one of the two data storage systems and the data replication management server, the primary software agent configured for performing data replication operations in response to commands from the data replication management server;

Applicant: Yao Wang, et al.  
U.S.S.N.: 10/608,757  
Filing Date: June 27, 2003  
EMC Docket No.: EMC-01-141CIP2

one or more failover software agents in communication with the primary software agent, the data replication management server, and at least one of the two data storage systems; a failover protocol for determining an order in which said software agents are designated to take over the data transfer operation in response to one or more data transfer commands when a failure of one or more of said software agents is determined. wherein if the primary agent experiences a failure, at least one of the one or more failover software agents takes over the data replication operations in response to one or more data replication manager server commands to take over.

7. (Currently amended) The architecture of Claim 6, wherein server commands to the software agents agent are sent over a network in accordance with an IP protocol.
8. (Currently amended) The architecture of Claim [[7]] 6, wherein the software agents agent communicate communicates with the at least one data storage system over the network in accordance with a Fibre Channel protocol.
9. (Currently amended) The architecture of Claim 6, wherein the data replication management server uses a predetermined hierachal relationship to select the order in which designated ones of each of the failover software agents are server is commanded to take over the work the one or more determined failed the primary software agents server.

Applicant: Yao Wang, et al.  
U.S.S.N.: 10/608,757  
Filing Date: June 27, 2003  
EMC Docket No.: EMC-01-141CIP2

10. (Currently amended) A method for managing fault-tolerant resources for replication of data stored in a data storage environment including at least two data storage systems, and wherein data is replicated from one of the at least two data storage systems to at least one other data storage system of the at least two data storage systems, and at least one software agent in communication with at least one data replication management server for managing the fault tolerant resources, the method comprising:

configuring one or more software agents as failover agents that are in communication with another software agent, designated as primary software agent, [[that it]] which is also in communication with the data replication management server, and at least one of the two data storage systems;

establishing a failover protocol for determining an order in which said software agents are designated to take over the data transfer operation in response to one or more data transfer commands when a failure of one or more of said software agents is determined. ~~at least one of the one or more failover software agents taking over the data replication operations in response to one or more data replication manager server commands to take over.~~

11. (Currently amended) The method of Claim 10, wherein server commands to the software agents ~~agent~~ are sent over a network in accordance with an IP protocol.

12. (Currently amended) The method of Claim [[11]] 10, wherein the software agents ~~agent~~ communicate communicates with the at least one data storage system over the network in accordance with a Fibre Channel protocol.

Applicant: Yao Wang, et al.  
U.S.S.N.: 10/608,757  
Filing Date: June 27, 2003  
EMC Docket No.: EMC-01-141CIP2

13. (Currently amended) The method of Claim 10, wherein the data replication management server uses a predetermined hierachal relationship to select the order in which designated ones of each of the failover software agents server is commanded to take over the work of the one or more determined failed the primary software agents server.

14. (Currently amended) A software agent failure tolerant computer system for managing resources for replication of data stored in a data storage environment including at least two data storage systems, and wherein data is replicated from one of the at least two data storage systems to at least one other data storage system of the at least two data storage systems, the system comprising:

a data replication management server;

a primary software agent, designated as primary software agent, in communication with at least one of the two data storage systems and the data replication management server, the primary software agent configured for performing data replication operations in response to commands from the data replication management server;

one or more failover software agents in communication with the primary software agent, the data replication management server, and at least one of the two data storage systems; and

a computer-executable program for carrying out a failover protocol for determining an order in which said software agents are designated to take over the data transfer operation in response to one or more data transfer commands when a failure of one or more of said software agents is determined. wherein if the primary agent experiences a failure, wherein at least one of the one or

Applicant: Yao Wang, et al.  
U.S.S.N.: 10/608,757  
Filing Date: June 27, 2003  
EMC Docket No.: EMC-01-141CIP2

~~more failover software agents takes over the data replication operations in response to one or more data replication manager server commands to take over.~~

15. (Currently amended) The system of Claim 14, wherein server commands to the software agents agent are sent over a network in accordance with an IP protocol.

16. (Currently amended) The system of Claim [[15]] 14, wherein the software agents agent communicate communicates with the at least one data storage system over the network in accordance with a Fibre Channel protocol.

17. (Currently amended) The system of Claim 14, wherein the data replication management server uses a predetermined hierachal relationship to select the order in which designated ones of each of the failover software agents are server is commanded to take over the work of the one or more determined failed the primary software agents server.